

VIOLECTRIC

HEADPHONE AMPLIFIER
with D/A converter

Violectric DHA V590

Short Form Manual



POWER SUPPLY

Mains power is provided via a three-pin IEC/CEE socket and mating "cold-appliance" mains cord with Schuko-type plug for units purchased in middle Europe.

The device is set to 230V mains, whereas the actual voltage may vary between 190 and 240 volts for flawless operation.

The mains voltage may be altered to 115 V AC supply inside the unit with the aid of a mains voltage selector. In this case stable operation is granted in a range of 85 to 120 V.

THE POWER SWITCH



The unit is put into operation by means of the "POWER" switch.

The power-on procedure takes about 5 seconds, during this time the "PROTECT" LED flashes red. It will go off when all internal parameter are checked and found ok.

Any unregular behavior will be displayed by the red "PROTECT" LED which also causes all outputs to be muted.

Always the last setting of the input-, resampling- and output-configuration is recalled.

The Remote Control of VIOELECTRIC DHA V590

This remote control sends out infrared rays.

For that purpose there is a infrared LED on the front.

The remote control should point in direction of the target device to obtain best functionality.

The operating distance is about 5 - 7 meters (15 - 20 ft).

With the "VOLUME +" and "VOLUME -" buttons the volume can be altered. This is done with a motor inside DHA V590 to get the volume knob into motion.

With the "MUTE" button the internal mute function is engaged.

A direct "MUTE" can only be released by the remote control.

With the "ANA + / -" buttons one of the three analogue inputs may be selected. With the "DIGI + / -" buttons one of four digital inputs may be selected. With the "RESAMPLING OFF / BEST / x1 / x2 / x4" buttons a resampling function is selected.

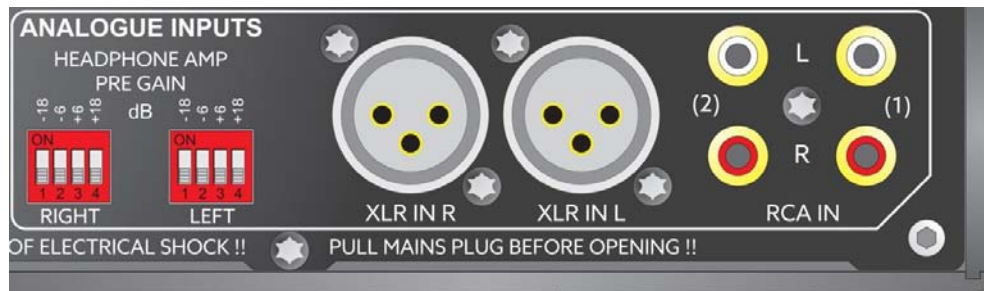
If you want to control the "Head-Output" and "Line-Output" of your DHA V590 you may chose an alternative mode from the menu.

These functions may be controlled afterwards with the buttons "x2 = Head-Output" und "x4 = Line-Output".

Now the front mounted headphone outputs as well as the rear mounted line outputs can be controlled remotely.



THE ANALOGUE SIGNAL-INPUTS can be found on the back panel.



THE BALANCED INPUTS are marked with "XLR IN L" and "XLR IN R", featuring gold plated connectors. With the aid of an adaptor also unbalanced sources may be connected.

THE UNBALANCED INPUTS are labelled as "RCA IN L 1/2" and "RCA IN R 1/2". Gold plated connectors are used here.

The input impedance on all analogue inputs is 10 kohms.

The maximum input level shall not exceed +21 dBu.

THE DIGITAL SIGNAL-INPUTS are situated on the back panel.



There are four different ones.

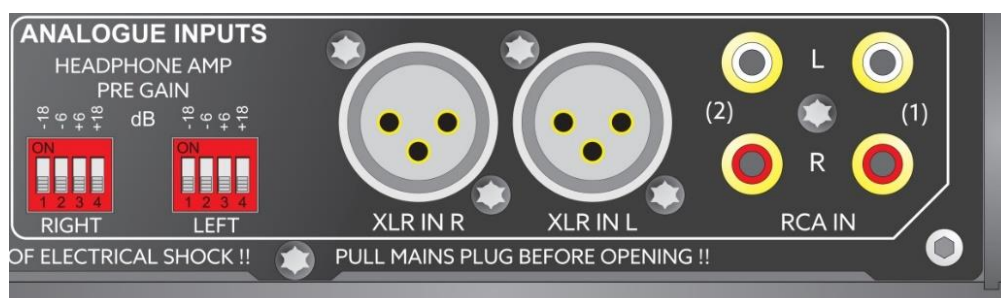
The optical input accepts PCM Signals up to 24 Bit, up to 96 kHz.

The coaxial input accepts PCM Signals up to 24 Bit, up to 192 kHz.

The balanced input accepts PCM Signals up to 24 Bit, up to 192 kHz.

The USB input accepts PCM Signals up to 32 Bit, up to 384 kHz and DSD Signals up to DSD 512.

PRE-GAIN - HEADPHONE AMP



Settings can be made for the left and right channel, they shall not be different from each other. With these switches an additional gain or attenuation may be set. It is dependent on the output level of the input source and the sensitivity of the headphones connected.

By this measure it is maintained to achieve lowest possible noise and maximum travel of the volume attenuator. The high gain/attenuation range of about 36 dB (factor 64) ensures a perfect match of any source with any headphone in the market.

SELECTING AN INPUT



With the "ANALOGUE INPUTS" and "DIGITAL INPUTS" buttons on the front panel one of three analogue inputs or one of four digital inputs may be selected and the appropriate LED is on. Concerning the digital inputs, also the "PCM" or "DSD" LED is on as far as a valid digital signal is detected.

RESAMPLING

is a mighty feature for the transformation/restoration of jittered signals into high-quality signals. As well, the signal quality of 44.1 or 48 kHz sources can be improved by converting them to a higher rate. This also applies to the USB input which often suffers from jitter caused by improperly treated computer outputs. With the aid of the resampling process nearly all jitter (and not only specific ones) is removed from the USB data stream without using "asynchronous USB mode" which is nonetheless also a feature of the USB input.

This isn't a mystery at all, but a feature offered by so-called sample-rate converters - available since the nineties of the past century.

While early sample rate converters could provide conversion ratios of 1:2 to 2:1 at 100dB dynamic range only, ratios of 1:48 to 48:1 (44.1 to 176.4 is 1:4) with 32 bit and at nearly 180 dB dynamic range are feasible today.

In principle, the digital data stream is asynchronously disassembled by a DSP specially developed for this purpose - and can be recombined at virtually any sample rate desired.

The quality of this recombination is directly dependent from the SRC's clock source. Therefore DHA V590 features a FEMTO-CLOCK with a phase jitter as low as 80×10^{-15} Femtoseconds.

The clock is powered by a low noise source.

By means of this process, all potential jitter vanishes almost completely and - due to the higher sampling rate - the analog filters after the converter stage can follow a much more straightforward and "musical" design. Furthermore, all digital input signals will be completed to 32 bit.

THE RESAMPLING BUTTON allows five modes OFF > x1 > x2 > x4 > BEST



- **OFF**, lights up when the resampling function is deactivated. The digital input (PCM and DSD) is forwarded to the D/A converter without alteration.
 - **x1**, the resampling function is activated. The digital input word will be recombined and forwarded to the D/A converter at original sample rate. DSD is converted into PCM.
 - **x2**, the resampling function is activated. The digital input word will be recombined and forwarded to the D/A converter at double sample rate. DSD is converted into PCM.
 - **x4**, the resampling function is activated. The digital input word will be recombined and forwarded to the D/A converter at 4 times the sample rate. DSD is converted into PCM.
 - **BEST**, function like above but the input word is forwarded to the D/A converter at 96 kHz, a rate at which most converters perform best. DSD is converted into PCM.
- The remote control allows a direct access to the above settings.

THE DIGITAL to ANALOG CONVERTERS

comprise digital filters (see the manual to set these), the stereophonic converters as such, as well as the analog output filters. Each converter (AK 4490) is based on a delta-sigma architecture and provides a dynamic range of 123 dB with THD+N at -112 dB. According to the double-mono architecture two 32 bit D/A converters per channel are used inside DHA V590 to achieve higher linearity and lower noise. An incoming 16, 20 or 24 bit signal is expanded in a 32 bit signal inside the converters as long as this was not processed by the resampling/reclocking unit. The internal frequency of the digital signal (and potential interference therein) is very high in comparison with the useful analog frequencies. Therefore, the subsequent analog low-pass filters have to meet less severe requirements in terms of high-frequency roll-off and can therefore be realized as "musical" discrete two-pole filters.

RESET OF THE PROCESSORS

The buttons, the complete inner control, the resampling and the D/A converters are in need of processors. If - of any reasons - nothing seems to work as it should anymore, follow these instructions to come back to **DEFAULT SETTINGS**:

Push and hold the "INPUT SELECT" button whilst powering the unit. Soon after all LEDs on the front panel will light up. Now you can release the "INPUT SELECT" button as all settings had been reset to default.

THE VOLUME ATTENUATOR is to set the desired volume for the left and right channel



simultaneously. Volume can also be set via your remote control. A motor will turn the knob in this case.

BALANCE CONTROL

is provided to compensate moderate level differences between left and right channel in a range of +/- 6 dB.

Only the right channel is affected.

THE AMPLIFIER(S)

The input signals are fed to an amplifier stage especially designed for this application, with eight transistors per channel. For balanced operation DHA V590 houses no less than four of those! Channels are physically separated from each other to ensure optimum crosstalk rejection. The frequency range covers 5 Hz ... 250 kHz (-0.5 dB) in order to ensure fully linear performance within the entire audible range. Overall gain is set to 0 dB (unbalanced) or +6 dB respectively (balanced) to ensure lowest self-generated noise.

ACTIVATING / DEACTIVATING THE HEADPHONE OUTPUTS



Pressing the "HEAD" button will activate/deactivate the headphone outputs on the front panel. The white LED shows the activated state.

THE BALANCED HEADPHONE OUTPUT



Because of it's four amps DHA V590 features a real balanced output with a four-pin XLR socket.

THE UNBALANCED HEADPHONE OUTPUTS

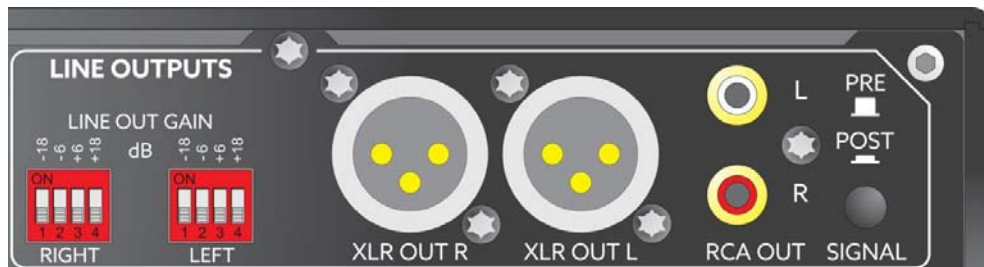
DHA V590 offers two "standard" outputs with 6,3 mm (1/4") TRS jack.

ACTIVATING / DEACTIVATING THE **HEADPHONE** OUTPUTS



Pressing the "LINE" button will activate/deactivate the rear line outputs.
The white LED shows the activated state.

THE LINE OUTPUTS



THE UNBALANCED LINE OUTPUTS

are gold plated and located on the rear panel of the unit and are marked as "RCA OUT L/R".

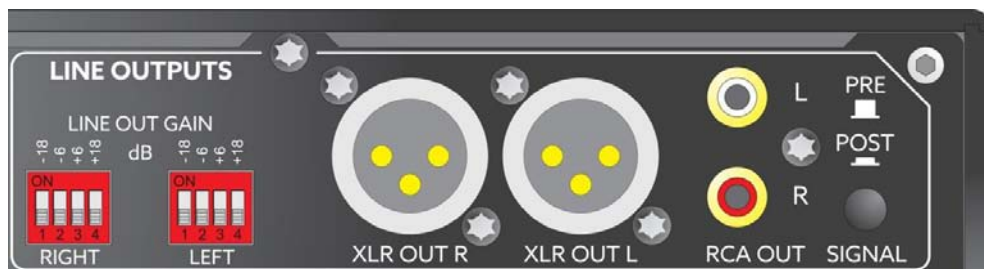
THE BALANCED LINE OUTPUTS

are gold plated and located on the rear panel of the unit and are marked as "XLR OUT L/R".

OUTPUT GAIN SETTINGS

The level of the activated input will appear unaltered at the line outputs. This level may be adapted by the "LINE OUT GAIN" switches in order to perfectly match the subsequent equipment.

SIGNAL SWITCH: PRE - POST FADER or FIXED - VARIABLE



The line out signal may be sourced from two different positions inside DHA V590.

If you want to use the activated input signal as is, maybe to source a unit with its own attenuator or a recording device, than the "**PRE-FADER**" or "**FIXED OUT**" mode is the right choice.

If you like to operate you DHA V590 as a pre-amp device of outstanding quality to drive some active speakers or power amps, than switch to "**POST-FADER**" or "**VARIABLE OUT**".

TECHNICAL DATA VIOLECTRIC DHA V590

All values RMS unwtld., 20 Hz - 20 kHz, Pre-Gain set to 0 dB

Input Parameter Analogue

Inputs (stereo, analogue): 1 x XLR female, balanced,
2 x RCA, unbalanced

Max. Input Voltage: + 21 dBu

Input Impedance: 10 kohm

Input Parameter Digital

Inputs (stereo, digital): 1 x optical, Tos-Link, PCM up to 24 Bit, 96 kHz
1 x Unbalanced, Coaxial, RCA, PCM up to 24 Bit, 192 kHz
1 x Balanced, XLR, PCM up to 24 Bit, 192 kHz
1 x USB, PCM up to 32 Bit, 384 kHz / DSD up to 512

Line Out Parameter

Line Outputs (stereo, analog): 1 x XLR male, balanced
1 x RCA unbalanced

Line-Out Gain: -18 / -12 / -6 / 0 / +6 / +12 / +18 dB

Max. Output Voltage: + 21 dBu

Output Impedance: < 1 Ohm

Headphone Amp Parameter

Nominal Input Sensitivity: +6 dBu

Amplifier Gain: 0 dB unbal. / +6 dB bal.

PRE-GAIN: -18 / -12 / -6 / 0 / +6 / +12 / +18 dB

Frequency Range: 5 Hz ... 250 kHz (- 0,5 dB)

Balance: +/- 6 dB, only effective in the right channel

Output Impedance: 0,15 Ohm unbal. / 0,3 Ohm bal.

Damping Factor (Load 50 Ohm): 320 unbal. / 160 bal.

Dynamic Range: > 131 dB (A-wtd)

Noise: < -103 dBu (A-wtd)

THD+N (1kHz/2x10V/100R = 1W): < -102 dB / < 0,0008 %

THD+N (1kHz/2x4V/32R = 0,5W): < -100 dB / < 0.001 %

Crosstalk: -105 dB (1 kHz) / -100 dB (15 kHz)

Headphone Outputs: 1 x 4-pol XLR
2 x ¼" (6.3 mm) Klinke

Max. Output Level

Conditions:

Balanced Operation

Both channels driven
(1kHz / < 0.1% THD+N)

R _L	U _a (dBu)	U _a (V)	P _a (mW)
600	28,7	21,1	740
300	28,6	20,9	1450
100	28,5	20,7	4300
50	27,3	17,9	6400
32	24,0	12,3	4700
16	17,3	5,7	2000
8	12,3	3,2	1300
4	6,8	1,7	700

Mains Supply:

230 V AC / 115 V AC max. 50 VA

Front, Back:

8 mm / 3 mm Aluminum, black anodized

Case:

3 mm / 4 mm Aluminum, black anodized

Case Dimensions:

290 x 80 x 254 mm / 11,4" x 3,15" x 10" (W x H x D)

Overall Dimensions:

290 x 90 x 282 mm / 11,4" x 3,5" x 11,1" (W x H x D)